PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2005-147618
(43)Date of publication of application : 09.06.2005

(51)Int.Cl. F24F 1/00

(21)Application number : 2003-389135
(22)Date of filing : 19.11.2003

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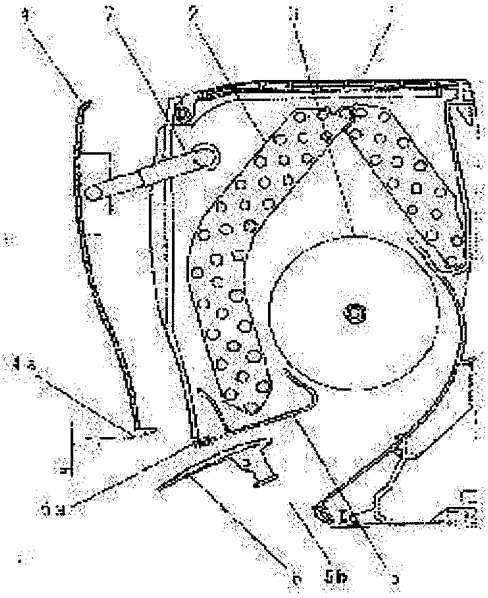
(54) AIR CONDITIONER

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an air conditioner having good appearance and reducing the dew condensation on its front panel part.
SOLUTION: An openable and closeable front panel 4 is mounted on a front face of an air conditioner main body 1, a lower end of the front panel 4 is located at a lower part with respect to an upper end 5a of a blowout port 5b in stopping the operation of the main body 1, the front panel 4 is moved to a front upper part, and the lower end 4a of the front panel 4 is located at an upper part with respect to the upper end 5a of the blowout port 5b in operating the main body 1, whereby the formation of an opening part for taking the air, on the front panel becomes unnecessary, and the cold air is not applied to the front panel.



CLAIMS

[Claim(s)]
[Claim 1]

In an air conditioner possessing wind circuits and exit cones, such as a heat exchanger, a fan, and a blow-off grill, provide the front panel which can be opened and closed in a front face of said air conditioner body, and at the time of shutdown of said main part. An air conditioner characterized by locating a lower end of said front panel up from an upper bed of said exit cone while a lower end of said front panel is caudad located from an upper bed of said exit cone and said front panel moves to a front upper part at the time of operation.
[Claim 2]
The air conditioner according to claim 1 allotting a position which can be recognized visually from a front lower part when it is the upper part and said front panel opens the indicator from a lower end of the closed front panel, while providing an indicator which displays operational status of a main part in a front face of said main part.
[Claim 3]
The 1st support plate that connected the front panel with a main part with support of a couple and with which one end was supported pivotally that the other end can be rotated on the front panel, respectively by main part at least in one side of support of said couple, The air conditioner according to any one of claims 1 to 2 to which the other end forms in said main part with the second support plate attached to said front panel enabling rotation and respectively free sliding, and one end is characterized by supporting pivotally said 1st support plate and said 2nd support plate, enabling still freer rotation.
[Claim 4]
On an axis used as a rotational fulcrum of panel opening and closing where the upper part allocates a panel drive in space surrounded by three way type of a back inclined heat exchanger, and the front part of an air conditioner body and a top panel part and which have it in an upper body. The air conditioner according to any one of claims 1 to 3 which rotation connection of the one end is carried out with the front panel, and support fixed to an axis from which the other end serves as a rotational fulcrum of said panel opening and closing, a drive, and a geared part which counters are fixed, and is characterized by having connected said geared part with said panel drive, and ****(ing).

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
[0001]
This invention relates to the structure of an air conditioner.
[Background of the Invention]
[0002]
Conventionally with the closing mechanism which established the blow-off grill which blows off a wind in the body front bottom, provided the front panel which opens and closes an air suction port above the blow-off grill, and was built in the main part as an air conditioner which provided

the panel in the air suction port. There were some which open and close said front panel to a cross direction (for example, refer to patent documents 1).
[0003]
the crosspiece which the front grill 12 is allocated ahead of the air conditioner body 11, and serves as an air-breathing mouth to internal wind circuits as other conventional examples in the front grill 12 as shown in drawing 7 -- two or more openings 12a of ** were formed.
[0004]
13 is an indicator which displays the operational status of the air conditioner body 11, and it is the upper part of the shuttlecock 15 for up-and-down wind-direction change which the wind blew and was established in the exit 14, And it was allocated in the approximately center part of the cross direction of the air conditioner body 11, and in operation of the air conditioner body 11 or irrespective of shutdown, it provided in the appearance part of the air conditioner body 11 so that it might always be visible (for example, refer to patent documents 2).
[0005]
There were some which formed panel opening-and-closing drive mechanism ahead of the heat exchanger which made curved shape to the near side as other conventional examples as an air conditioner which provided the panel in the air suction port (for example, refer to patent documents 3).
[Patent documents 1] JP,04-084042,A
[Patent documents 2] JP,2003-156228,A
[Patent documents 3] JP,2003-74896,A
[Description of the Invention]
[Problem(s) to be Solved by the Invention]
[0006]
However, if it is in some which open and close the above front panels forward and backward, In order for the front panel to blow off and to move to the abbreviated level ahead of a grill, at the time of cooling operation, the cold blast which blows off from the upper part of a blow-off grill was equivalent to the lower end part of the front panel, and became a turbulent flow easily, and the technical problem that it was easy to generate dew condensation near the occurred.
[0007]
the crosspiece which serves as an air-breathing mouth in the front grill 12 in the case of the conventional example shown in drawing 7 -- since the opening 12a of ** was geometrically irregular, dust adhered easily and wiping was difficult. In order to secure an air suction amount enough, a certain amount of effective area product was indispensable, and there were many restrictions on a design.
[0008]
Since the indicator 13 was formed in the appearance part of the air conditioner body 11 and was always exposed, also where operation of the air conditioner body 11 is suspended, the portion serves as a strong part of impact nature on a design, and could not become the high design of fine sight nature felt refreshed easily.
[0009]
When the depth size of a main part became large and it installed in a wall, the conventional air conditioner which formed panel opening-and-closing drive mechanism ahead of the heat exchanger which made curved shape to the near side serves as a design with a feeling of oppression, and could not become the high design of fine sight nature felt refreshed with a thin shape easily.
[0010]
This invention solves the above-mentioned conventional technical problem, is cheap composition, and improves the fine sight nature of an air conditioner, and an object of this invention is to provide an air conditioner with still less dew condensation in a front panel lower end part.
It is a thing.
[Means for Solving the Problem]
[0011]

Provide this invention, in order to solve an aforementioned problem, and the front panel which can be opened and closed in a front face of an air conditioner body provided with an exit cone at the time of shutdown of said main part. From an upper bed of said exit cone, a lower end of said front panel is located caudad, and at the time of operation. While said front panel moves to a front upper part, a lower end of said front panel is the thing it was made to be located up from an upper bed of said exit cone, fine sight nature to which an air suction opening can be secured between the front panel and a main part and in which the front panel does not have an opening is high -- a design -- in **, since there is no unevenness of a crosspiece etc. in the surface, the front panel does not become dirty easily, and since cold blast which blew off from an exit cone further does not hit easily in a front panel lower end, dew condensation can be prevented.
[Effect of the Invention]
[0012]
Since there is no unevenness of the surfaces, such as a crosspiece, while being able to make the front panel the high design of fine sight nature without an opening, the air conditioner of this invention does not become dirty easily, and also when it becomes dirty, it becomes easy to sweep and clean it. Since the cold blast which blew off from the exit cone is not equivalent to the lower end of the front panel easily, dew condensation can also be prevented. The thin shape of a main part is planned and it can be made the high design of fine sight nature.
[Best Mode of Carrying Out the Invention]
[0013]
The 1st invention provides the front panel which can be opened and closed in the front face of the air conditioner body which possesses wind circuits and exit cones, such as a heat exchanger, a fan, and a blow-off grill, inside, and at the time of the shutdown of said main part. From the upper bed of said exit cone, the lower end of said front panel is located caudad, and at the time of operation. While said front panel moves to a front upper part, the lower end of said front panel is the thing it was made to be located up from the upper bed of said exit cone, the fine sight nature to which an air suction opening can be secured between the front panel and a main part and in which the front panel does not have an opening is high -- a design -- since the cold blast which the front panel did not become dirty easily and blew off from the exit cone further since there was no unevenness of a crosspiece etc. in the surface does not hit ** easily in a front panel lower end, dew condensation can be prevented
While the 2nd invention provides the indicator which displays the operational status of a main part in the front face of said main part, From the lower end of the closed front panel, from a front lower part, are the upper part, and when said front panel opens the indicator, are it what was allotted to the position which can be recognized visually, and at the time of shutdown. By making it not visible from outside, an indicator can eliminate the eye harm on a design and can raise the fine sight nature of an air conditioner.
[0014]
The 1st support plate with which the 3rd invention connected the front panel with the main part with the support of the couple, and one end was supported pivotally that the other end can be rotated on the front panel, respectively by the main part at least in one side of the support of said couple, One end is what the other end formed in said main part with the second support plate attached to said front panel enabling rotation and respectively free sliding, and supported pivotally for said 1st support plate and said 2nd support plate on it enabling still freer rotation, The structure of support of moving the front panel to a front upper part is simplified, there is little failure, it is cheap and, moreover, a weight saving can be attained.
[0015]
The 4th invention allocates a panel drive in the space surrounded by the three way type of the heat exchanger toward which the upper part inclined back, and the front part of an air conditioner body and a top panel part, On the axis used as the rotational fulcrum of the panel opening and closing in an upper body. By rotation connection of the one end being carried out with the front panel, and the support fixed to the axis from which the other end serves as a rotational fulcrum of said panel opening and closing, a drive, and the geared part which counters being fixed, and connecting said geared part with said panel drive, and ****(ing) it, While

becoming movable to a sliding direction and being able to prevent dew condensation in a front panel lower end, carrying out the opening-and-closing drive of the panel, the thin shape of a main part is planned and it can be made the high design of fine sight nature.
[0016]
Hereafter, an embodiment of the invention is described, referring to drawings. This invention is not limited by this embodiment.
[0017]
(Embodiment 1)
Drawing 1 and 2 are used for below and the 1st example of this invention is described to it. About a conventional example and identical parts, the explanation is omitted using identical codes and a name.
Drawing 1 is a cross-sectional view when operation of the indoor unit body 1 of the air conditioner in a 1st embodiment of this invention has stopped, and drawing 2 shows the cross-sectional view at the time of operation.
[0018]
In drawing 1, the heat exchanger 2, the fan 3, and the blow-off grill 5 are arranged on the inside of the main part 1. While it is open for free passage to the blow-off grill 5, the shuttlecock 6 for up-and-down wind-direction change which changes the direction of the air blowing off is formed in the exit cone 5b which blows off cold blast or/, and warm air outside.
[0019]
The front panel 4 connected with the main part 1 with the support 7 rotated with the drive which is not illustrated is allocated by the front face of the main part 1. The opening for air introduction is not provided in the front panel 4.
[0020]
At the time of shutdown, as shown in drawing 1, when a drive rotates the support 7 in the direction which closes the front panel 4 (counterclockwise rotation), the front panel 4 closes and it is close to the main part 1. In that case, the lower end 4a of the front panel 4 is located under the upper bed 5a of the exit cone 5b.
[0021]
And at the time of operation, as shown in drawing 2, when a drive rotates the support 7 in the direction which the front panel 4 opens (clockwise rotation), the front panel 4 moves to a front upper part, and the lower end 4a of the front panel 4 is located up from the upper bed 5a of the exit cone 5b only for B minutes.
[0022]
About the air conditioner constituted as mentioned above, the operation and an operation are explained below.
[0023]
First, at the time of operation, the front panel 4 moves to a front upper part, and by rotation of the fan 3 indoor air, It absorbs from the crevice between the upper parts of the front panel 4 and the main part 1, the sides, and the lower parts which were ahead located from the main part 1, heat exchange is carried out to cold or pre-heating by the heat exchanger 2, it passes along the blow-off grill 5 and the exit cone 5b, a blow-off angle is changed by the shuttlecock 6 for up-and-down wind-direction change, and it blows off indoors.
[0024]
In air conditioning, the cold blast which blows off from the exit cone 5b, When an obstacle etc. are ahead, in it, become a turbulent flow, and are easy to generate dew condensation, but in this example. From the upper bed 5a of the exit cone 5b, as shown in drawing 2, since the lower end 4a of the front panel 4 is located up only for height B minutes, cold blast does not hit the lower end 4a easily, and it can prevent generating of dew condensation.
[0025]
At the time of shutdown, as shown in drawing 1, since the lower end 4a of the front panel 4 is located caudad only for height A minutes, the upper bed 5a of the exit cone 5b on which the nonwoven fabric etc. were stuck is concealed, and fine sight nature can be improved from the upper bed 5a of the exit cone 5b.

[0026]
Since the opening for air introduction becomes unnecessary entirely at the front panel 4 according to this example, dust is not accumulated, cleaning becomes easy and, moreover, the sophisticated design of a fine sight can be given.
[0027]
(Embodiment 2)
A 2nd embodiment of this invention is described using drawing 3 and 4. About the above-mentioned example and identical parts, the explanation is omitted using identical codes and a name.
[0028]
Drawing 3 is a cross-sectional view of the indoor unit body 1 of an air conditioner, the front panel 4 in the state where it opened is a solid line, and the front panel 4 in the state where it closed is shown by the two-dot chain line, respectively.
[0029]
Drawing 4 is a front view of the main part 1 at the time of shutdown.
[0030]
In drawing 3, the indicator 8 which displays the operational status of an air conditioner is allocated in the anterior part of the drain pan part (not shown) of the blow-off grill 5.
[0031]
And the above-mentioned indicator 8 is not visible during the shutdown of the main part 1, and is attached to the position which can be recognized visually from a front lower part during operation.
[0032]
When the main part 1 is seen from the arrowed direction 9 of a front lower part at the time of shutdown, from the lower end 4a of the front panel 4, the lower end 8a of the indicator 8 is up, and, specifically, is concealed with the front panel 4 only for height C minutes. When the main part 1 is looked up at from a front lower part at the time of operation (arrowed direction 9), since it has allotted caudad from the lower end 4a of the front panel 4 only for height D minutes, the lower end 8a of the indicator 8 can recognize the indicator 8 visually more easily than a front lower part.
[0033]
As mentioned above, since according to this example the indicator 8 is concealed inside the front panel 4 at the time of shutdown as shown in drawing 4, the fine sight nature of an air conditioner can be raised.
[0034]
(Embodiment 3)
Next, a 3rd embodiment of this invention is described using drawing 5 and 6. About the above-mentioned example and identical parts, the explanation is omitted using identical codes and a name.
[0035]
Drawing 5 is in the state which the front panel 4 opened, and is the figure to which the support 12 of the couple which connects the front panel 4 with the main part 1, and its mounting part were expanded.
[0036]
The 1st support plate 14 with which the support 12 was provided with the axis 14a with which one end was supported pivotally that the other end can be rotated on the front panel 4, respectively by the main part 1, The other end becomes the receiving part A1b of the groove or the shape of a long hole which one end provided in the main part 1 from the 2nd support plate 15 provided with the axis 15a attached to receiving part B4b of the groove or the shape of a long hole provided in the front panel 4 enabling rotation and respectively free sliding, Furthermore, the 1st support plate 14 and 2nd support plate 15 are connected with the axis 13 in the approximately center part, enabling free rotation.
[0037]
11a is the gear A for rotating the 1st support plate 14 in one, and is rotated with the drive 11 via

the gear B11b.
[0038]
In the above-mentioned composition, like drawing 6, at the time of shutdown. By the gear A rotated with the drive 11, B11a, and 11b. The 1st support plate 14 rotates counterclockwise, while the axis 15a in the both ends of the 2nd support plate 15 rotates, it slides, it moves so that it may separate in a sliding direction, respectively, and the 1st support plate 14 and 2nd support plate 15 come to lap, and the front panel 4 can make it close to the main part 1.
[0039]
At the time of operation, via the gear B11b and the gear A11a with the drive 11, If the 1st support plate 14 is rotated clockwise, it moves so that the axis 15a in the both ends of the 2nd support plate 15 may approach in a sliding direction, and will be in the state where the 1st and 2nd support plate 14 and 15 opens, as [show / in drawing 5].
[0040]
Since the center of rotation of the axis 14a by the side of the main part 1 of the 1st support plate 14 is being fixed at this time, the front panel 4 can be moved to a front upper part from the main part 1.
Thus, according to this example, the structure of the support 12 becomes an easy thing which consists of two parts, and cost can be reduced.
[0041]
Although the axis provided in the both ends of the 2nd support plate 15 was received in the above-mentioned example by the receiving parts B and A of the slot established in the front panel 14 and main part 1 side, or the shape of a long hole, Even if the receiving parts B and A of a slot or the shape of a long hole are formed in the both ends of the reverse composition 15, i.e., the 2nd support plate, and it provides an axis in the front panel 14 and main part 1 side, the same effect is not acquired also until it says.
[0042]
(Embodiment 4)
Next, a 4th embodiment of this invention is described using drawing 5 and 6. About the above-mentioned example and identical parts, the explanation is omitted using identical codes and a name.
[0043]
The drive 11 is the inside of the front part of the main part 1, and a top panel part, and is engaging with the heat exchanger toward which the upper part inclined back.
[0044]
The 1st support plate 14 with which the support 12 was provided with the axis 14a with which one end was supported pivotally that the other end can be rotated on the front panel 4, respectively by the main part 1, The other end becomes the receiving part A1b of the groove or the shape of a long hole which one end provided in the main part 1 from the 2nd support plate 15 provided with the axis 15a attached to receiving part B4b of the groove or the shape of a long hole provided in the front panel 4 enabling rotation and respectively free sliding, Furthermore, the 1st support plate 14 and 2nd support plate 15 are connected with the axis 13 in the approximately center part, enabling free rotation.
[0045]
11a is the gear A for rotating the 1st support plate 14 in one, and is rotated with the drive 11 via the gear B11b.
[0046]
In the above-mentioned composition, the drive 11 In order that [of a heat exchanger] it may be mostly allocated inside a summit and the foremost part and the approximately upper direction of a drive may allocate the axis 14a, If the gear B11b rotates at the time of operation, a drive transmits to the gear A11a connected first, the axis 14a is rotated, the support plate 14 is rotated further clockwise, and the panel 4 can be moved up. Thus, by arranging parts, drive mechanism can be miniaturized, slimming down of the main part 1 can be attained, and it can be made the high design of fine sight nature felt refreshed.
[Industrial applicability]

[0047]
As mentioned above, the air conditioner concerning this invention, While being able to make the front panel the high design of fine sight nature without an opening, Since the cold blast which it became easy to sweep and clean and blew off from the exit cone is not equivalent to the lower end of the front panel easily also when it is hard to become dirty and becomes dirty, since there is no unevenness of the surfaces, such as a crosspiece, and dew condensation is also can be prevented, it is applicable also to the use of the residence etc. which ask for high interior design nature.
[Brief Description of the Drawings]
[0048]
[Drawing 1]The cross-sectional view at the time of the shutdown of the air conditioner in the embodiment of the invention 1
[Drawing 2]The cross-sectional view at the time of operation of the air conditioner
[Drawing 3]The cross-sectional view of the air conditioner in the embodiment of the invention 2
[Drawing 4]The front view at the time of the shutdown of the air conditioner
[Drawing 5]The enlarged drawing of the support of the air conditioner in the embodiment of the invention 3
[Drawing 6]The cross-sectional view at the time of the shutdown of the air conditioner
[Drawing 7]The front view of the conventional air conditioner
[Description of Notations]
[0049]
1 Main part
4 Front panel
4a Lower end
5 Blow-off grill
5a Upper bed
5b Exit cone
8 Indicator
11 Drive
12 Support
14 The 1st support plate
15 The 2nd support plate

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[0048]
[Drawing 1]The cross-sectional view at the time of the shutdown of the air conditioner in the embodiment of the invention 1
[Drawing 2]The cross-sectional view at the time of operation of the air conditioner

[Drawing 3]The cross-sectional view of the air conditioner in the embodiment of the invention 2
[Drawing 4]The front view at the time of the shutdown of the air conditioner
[Drawing 5]The enlarged drawing of the support of the air conditioner in the embodiment of the invention 3
[Drawing 6]The cross-sectional view at the time of the shutdown of the air conditioner
[Drawing 7]The front view of the conventional air conditioner

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[Translation done.]

(19)日本国特許庁(JP)　(12)公開特許公報(A)　(11)特許出願公開番号
特開2005-147618
(P2005-147618A)
(43)公開日　平成17年6月9日(2005.6.9)

(51)Int.Cl.[7]	F I	テーマコード（参考）
F24F 1/00	F24F 1/00 401B	3L051

審査請求 有　請求項の数 4　OL　（全 10 頁）

(21)出願番号　特願2003-389135 (P2003-389135)
(22)出願日　平成15年11月19日 (2003.11.19)

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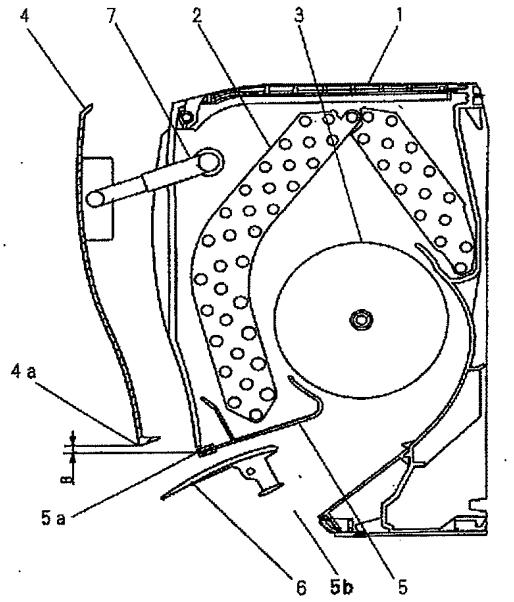
最終頁に続く

(54)【発明の名称】空気調和機

(57)【要約】
【課題】美観性に優れ、前面パネル部での結露の少ない空気調和機を提供すること。
【解決手段】空気調和機本体１の前面に開閉可能な前面パネル４を設け、前記本体１の運転停止時には、前記前面パネル４の下端が吹出し口５ｂの上端５ａより下方に位置し、運転時には、前記前面パネル４が前方上方に移動するとともに、前記前面パネル４の下端４ａが、前記吹出し口５ｂの上端５ａより上方に位置するようにして、空気取り入れ用の開口部不用の前面パネルとし、さらに冷風が前記前面パネルに当たらないようにした。
【選択図】図２



【特許請求の範囲】
【請求項1】
熱交換器、ファン、吹出しグリル等の風回路及び吹出し口を具備した空気調和機において、前記空気調和機本体の前面に開閉可能な前面パネルを設け、前記本体の運転停止時には、前記前面パネルの下端が前記吹出し口の上端より下方に位置し、運転時には、前記前面パネルが前方上方に移動するとともに、前記前面パネルの下端が、前記吹出し口の上端より上方に位置することを特徴とする空気調和機。
【請求項2】
本体の運転状態を表示する表示部を前記本体の前面に設けるとともに、その表示部を、閉じた前面パネルの下端より上方で、かつ前記前面パネルが開いた時に前方下方から視認できる位置に配したことを特徴とする、請求項１記載の空気調和機。
【請求項3】
本体と前面パネルを一対の支持具で連結し、前記一対の支持具の少なくとも一方を、一端が本体に、他端が前面パネルにそれぞれ回動自在に軸支された第１の支持板と、一端が前記本体に、他端が前記前面パネルにそれぞれ回動かつ摺動自在に取りつけられた第二の支持板で形成し、さらに前記第１の支持板と前記第２の支持板を回動自在に軸支したことを特徴とする、請求項１～２のいずれかに記載の空気調和機。
【請求項4】
上部が後方に傾斜された熱交換器と、空気調和機本体の前面部と天面部との三方に囲まれた空間にパネル駆動装置を配設し、本体上部にあるパネル開閉の回動支点となる軸には、一端が前面パネルと回動連結され、他端が前記パネル開閉の回動支点となる軸に固定された支持具と駆動装置と対向するギア部が固定され、かつ前記ギア部が前記パネル駆動装置と連接して配接したことを特徴とする、請求項１～３のいずれかに記載の空気調和機。

【発明の詳細な説明】
【技術分野】
【0001】
本発明は空気調和機の構造に関するものである。
【背景技術】
【0002】
従来、空気吸込口にパネルを設けた空気調和機として、本体前面の下側に、風を吹き出す吹出しグリルを設け、その吹出しグリルの上方に、空気吸込口を開閉する前面パネルを設け、本体に内蔵された開閉装置で、前記前面パネルを前後方向に開閉するものがあった(例えば、特許文献１参照)。
【0003】
また、他の従来例として、図７に示すように、空気調和機本体１１の前方に前面グリル１２が配設され、その前面グリル１２には、内部の風回路への空気の吸込み口となる桟状の開口部１２ａが複数設けられていた。
【0004】
１３は、空気調和機本体１１の運転状態を表示する表示部で、風の吹き出口１４に設けられた上下風向変更用羽根１５の上方で、かつ空気調和機本体１１の幅方向の略中央部に配設され、空気調和機本体１１の運転中または運転停止にかかわらず、常時見えるように空気調和機本体１１の外観部に具備されていた（例えば、特許文献２参照）。
【0005】
また、他の従来例として、空気吸込口にパネルを設けた空気調和機として、手前側に湾曲形状をなした熱交換器の前方にパネル開閉駆動機構を設けたものがあった（例えば、特許文献３参照）。
【特許文献1】特開平０４－０８４０４２号公報
【特許文献2】特開２００３－１５６２２８号公報
【特許文献3】特開２００３－７４８９６号公報
【発明の開示】

【発明が解決しようとする課題】
【0006】
しかしながら上記のような前面パネルを前後に開閉するものにあっては、前面パネルが吹出しグリルの前方に略水平に移動するため、冷房運転時に、吹出しグリルの上部より吹出される冷風が、前面パネルの下端部に当たり、乱流となり易く、また、その付近で結露が発生し易いという課題があった。
【0007】
また、図７に示される従来例の場合、前面グリル１２にある空気の吸込み口となる桟状の開口部１２ａが、形状的に凹凸があるため、ほこりが付着し易く、拭き掃除が困難であった。また、空気吸込み量を充分確保するためにある程度の開口面積が不可欠で、デザイン上の制約が多かった。
【0008】
さらに、表示部１３が、空気調和機本体１１の外観部に設けられ、常時露出しているため、空気調和機本体１１の運転を停止した状態でも、その部分がデザイン上、インパクト性の強い箇所となり、すっきりとした美観性の高いデザインとなりにくかった。
【0009】
また、手前側に湾曲形状をなした熱交換器の前方にパネル開閉駆動機構を設けた、従来の空気調和機は、本体の奥行き寸法が大きくなり、壁に設置した場合、圧迫感のあるデザインとなり、薄型ですっきりとした美観性の高いデザインとなりにくかった。
【0010】
本発明は、上記従来の課題を解決するもので、安価な構成で、空気調和機の美観性を高め、さらに、前面パネル下端部での結露の少ない空気調和機を提供することを目的とするものである。
【課題を解決するための手段】
【0011】
上記課題を解決するため本発明は、吹出し口を備えた空気調和機本体の前面に開閉可能な前面パネルを設け、前記本体の運転停止時には、前記前面パネルの下端が前記吹出し口の上端より下方に位置し、運転時には、前記前面パネルが前方上方に移動するとともに、前記前面パネルの下端が、前記吹出し口の上端より上方に位置するようにしたもので、前面パネルと本体との間で空気吸込み口が確保でき、前面パネルが開口部のない美観性の高いデザインなるとともに、表面に桟などの凹凸がないため、前面パネルが汚れにくく、さらに吹出し口より吹出した冷風が前面パネル下端に当りにくいため、結露が防止できる。
【発明の効果】
【0012】
本発明の空気調和機は、前面パネルを開口部のない美観性の高いデザインにすることができるとともに、桟などの表面の凹凸がないため、汚れにくく、また汚れた場合にも、拭き掃除が容易となる。また、吹出し口より吹出した冷風が前面パネルの下端に当りにくいため、結露も防止できる。また本体の薄型が図られ、美観性の高いデザインにすることができる。
【発明を実施するための最良の形態】
【0013】
第１の発明は、内部に熱交換器、ファン、吹出しグリル等の風回路及び吹出し口を具備した空気調和機本体の前面に開閉可能な前面パネルを設け、前記本体の運転停止時には、前記前面パネルの下端が前記吹出し口の上端より下方に位置し、運転時には、前記前面パネルが前方上方に移動するとともに、前記前面パネルの下端が、前記吹出し口の上端より上方に位置するようにしたもので、前面パネルと本体との間で空気吸込み口が確保でき、前面パネルが開口部のない美観性の高いデザインなるとともに、表面に桟などの凹凸がないため、前面パネルが汚れにくく、さらに吹出し口より吹出した冷風が前面パネル下端に当りにくいため、結露が防止できる
第２の発明は、本体の運転状態を表示する表示部を前記本体の前面に設けるとともに、

その表示部を、閉じた前面パネルの下端より上方で、かつ前記前面パネルが開いた時に前方下方から視認できる位置に配したもので、運転停止時には、表示部が外から見えないようにすることにより、デザイン上の目障りをなくし、空気調和機の美観性を向上させることができる。

【0014】

第３の発明は、本体と前面パネルを一対の支持具で連結し、前記一対の支持具の少なくとも一方を、一端が本体に、他端が前面パネルにそれぞれ回動自在に軸支された第１の支持板と、一端が前記本体に、他端が前記前面パネルにそれぞれ回動かつ摺動自在に取りつけられた第二の支持板で形成し、さらに前記第１の支持板と前記第２の支持板を回動自在に軸支したもので、前面パネルを前方上方へ移動させる支持具の構造が簡略化され、故障が少なく、安価で、しかも軽量化を図ることができる。

【0015】

第４の発明は、上部が後方に傾斜された熱交換器と、空気調和機本体の前面部と天面部との三方に囲まれた空間にパネル駆動装置を配設し、本体上部にあるパネル開閉の回動支点となる軸には、一端が前面パネルと回動連結され、他端が前記パネル開閉の回動支点となる軸に固定された支持具と駆動装置と対向するギア部が固定され、かつ前記ギア部が前記パネル駆動装置と連接して配接されることにより、パネルを開閉駆動させつつ、上下方向に移動可能となり、前面パネル下端での結露が防止できるとともに、本体の薄型が図られ、美観性の高いデザインにすることができる。

【0016】

以下、本発明の実施の形態について、図面を参照しながら説明する。なお、この実施の形態によって本発明が限定されるものではない。

【0017】

（実施の形態１）

以下に、本発明の第１の実施例を図１、２を用いて説明する。なお、従来例と同一部分については、同一符号、名称を用いてその説明を省略する。

図１は、本発明の第１の実施の形態における空気調和機の室内ユニット本体１の運転が停止している時の横断面図で、図２は運転時の横断面図を示すものである。

【0018】

図１において、本体１の内部には、熱交換器２、ファン３、吹出しグリル５が配されている。吹出しグリル５に連通するとともに、冷風或いは／及び温風を外部に吹出す吹出し口５ｂには、吹き出される空気の方向を変える上下風向変更用羽根６が設けられている。

【0019】

本体１の前面には、本体１と、図示しない駆動装置によって回転駆動される支持具７で連結された前面パネル４が配設されている。前面パネル４には、空気取り入れ用の開口部は設けられていない。

【0020】

図１に示されるように、運転停止時には、駆動装置が、前面パネル４を閉じる方向に支持具７を回動（反時計方向）することにより、前面パネル４が閉じると共に本体１に密接する。その際、前面パネル４の下端４ａは、吹出し口５ｂの上端５ａの下方に位置している。

【0021】

そして、運転時には、図２に示されるように、駆動装置が、前面パネル４が開く方向に支持具７を回動（時計方向）することにより、前面パネル４が、前方上方に移動して、前面パネル４の下端４ａは、吹出し口５ｂの上端５ａよりＢ分だけ、上方に位置する。

【0022】

以上のように構成された空気調和機について、以下その動作、作用を説明する。

【0023】

まず、運転時には、前面パネル４が前方上方に移動し、ファン３の回転により、室内空気は、本体１より前方に位置した前面パネル４と本体１の上方、側方、下方の隙間より吸

込まれ、熱交換器２により、冷気や暖気に熱交換され、吹出しグリル５、吹出し口５ｂを通り、上下風向変更用羽根６により、吹出し角度を変更されて、室内に吹出される。

【0024】

冷房の場合、吹出し口５ｂから吹出される冷風は、前方に障害物などがある場合、それに当たり、乱流となり、結露を発生し易いが、本実施例では、図２に示すように、吹出し口５ｂの上端５ａより、前面パネル４の下端４ａは高さＢ分だけ上方に位置するため、冷風は下端４ａに当たりにくく、結露の発生を防止することができる。

【0025】

また運転停止時は、図１に示されるように、吹出し口５ｂの上端５ａより、前面パネル４の下端４ａが、高さＡ分だけ下方に位置するため、不織布などが貼付けられた吹出し口５ｂの上端５ａが隠蔽され、美観性を高めることができる。

【0026】

また、本実施例によれば、前面パネル４に空気取り入れ用の開口部が一切不用になるので、埃が蓄積する事が無く、掃除が容易になり、しかも美観の優れたデザインを施すことができるようになる。

【0027】

（実施の形態２）

本発明の第２の実施の形態を図３、４を用いて説明する。なお、上記実施例と同一部分については、同一符号、名称を用いてその説明を省略する。

【0028】

図３は、空気調和機の室内ユニット本体１の横断面図で、開いた状態の前面パネル４が実線で、閉じた状態の前面パネル４が２点鎖線でそれぞれ示されている。

【0029】

図４は運転停止時の本体１の正面図である。

【0030】

図３において、吹出しグリル５の水受け皿部（図示せず）の前部には、空気調和機の運転状態を表示する表示部８が配設されている。

【0031】

そして、上記表示部８は、本体１の運転停止中は見えず、運転中は、前方下方より視認できる位置に取り付けられている。

【0032】

具体的には、運転停止時に、本体１を前方下方の矢視方向９から見た場合、表示部８の下端８ａは、前面パネル４の下端４ａより高さＣ分だけ上方にあり、前面パネル４により隠蔽されている。また運転時には、本体１を前方下方から見上げた場合（矢視方向９）、表示部８の下端８ａは、前面パネル４の下端４ａより高さＤ分だけ下方に配しているので、表示部８は、前方下方より容易に視認できる。

【0033】

以上のように、本実施例によれば、図４に示されるように、運転停止時には、表示部８は前面パネル４の内側に隠蔽されるため、空気調和機の美観性を向上させることができる。

【0034】

（実施の形態３）

次に、本発明の第３の実施の形態を図５、６を用いて説明する。なお、上記実施例と同一部分については、同一符号、名称を用いてその説明を省略する。

【0035】

図５は、前面パネル４が開いた状態で、前面パネル４を本体１に連結する一対の支持具１２並びにその取り付け部を拡大した図である。

【0036】

支持具１２は、一端が本体１に、他端が前面パネル４にそれぞれ回動自在に軸支された軸１４ａを備えた第１の支持板１４と、一端が本体１に設けた溝状又は長孔状の受部Ａ１

ｂに、他端が前面パネル４に設けた溝状又は長孔状の受部Ｂ４ｂにそれぞれ回動かつ摺動自在に取り付けられた軸１５ａを備えた第２の支持板１５からなり、さらに第１の支持板１４と第２の支持板１５は、略中央部で軸１３で回動自在に連結されている。

【0037】

１１ａは、第１の支持板１４を一体的に回動させるためのギアＡで、ギアＢ１１ｂを介して駆動装置１１により、回転駆動されるようになっている。

【0038】

上記構成において、図６のように、運転停止時には、駆動装置１１によって回転駆動されるギヤＡ，Ｂ１１ａ、１１ｂにより、第１の支持板１４が、反時計方向に回転し、第２の支持板１５の両端にある軸１５ａが回動しながら摺動して、上下方向でそれぞれ離れるように移動して第１の支持板１４と第２の支持板１５が重なるようになり、前面パネル４が本体１に密接させることができる。

【0039】

また、運転時には、駆動装置１１によりギアＢ１１ｂ、ギヤＡ１１ａを介して、第１の支持板１４を時計方向に回転させると、第２の支持板１５の両端にある軸１５ａが上下方向で近づくように移動して、図５に示されるように、第１、第２の支持板１４、１５が開く状態になる。

【0040】

この時、第１の支持板１４の本体１側の軸１４ａの回転中心は固定されているので、前面パネル４は本体１より前方上方に移動させることができる。

このように本実施例によれば、支持具１２の構造が２部品からなる簡単なものとなり、コストを低減できる。

【0041】

なお、上記実施例において、第２の支持板１５の両端に設けた軸を、前面パネル１４と本体１側に設けた溝或いは長孔状の受部Ｂ、Ａで受けたが、逆の構成、すなわち第２の支持板１５の両端に溝或いは長孔状の受部Ｂ、Ａを設け、前面パネル１４と本体１側に軸を設けても、同様の効果が得られることは言うまでも無い。

【0042】

（実施の形態４）

次に、本発明の第４の実施の形態を図５、６を用いて説明する。なお、上記実施例と同一部分については、同一符号、名称を用いてその説明を省略する。

【0043】

駆動装置１１は、本体１の前面部および天面部の内側で、上方が後方に傾斜された熱交換器に係合されている。

【0044】

支持具１２は、一端が本体１に、他端が前面パネル４にそれぞれ回動自在に軸支された軸１４ａを備えた第１の支持板１４と、一端が本体１に設けた溝状又は長孔状の受部Ａ１ｂに、他端が前面パネル４に設けた溝状又は長孔状の受部Ｂ４ｂにそれぞれ回動かつ摺動自在に取り付けられた軸１５ａを備えた第２の支持板１５からなり、さらに第１の支持板１４と第２の支持板１５は、略中央部で軸１３で回動自在に連結されている。

【0045】

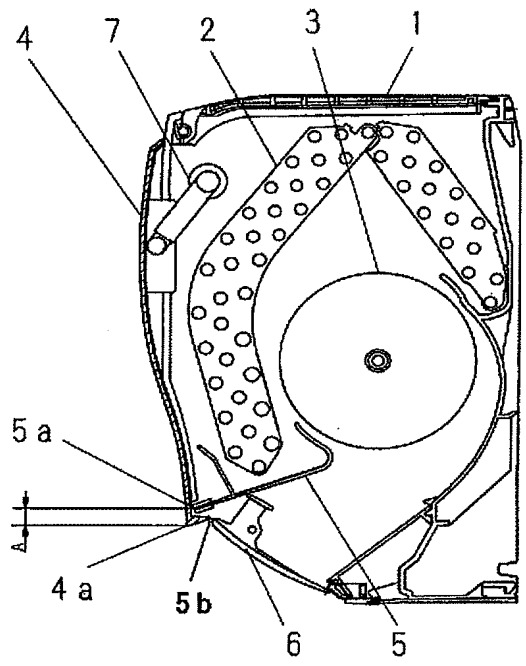
１１ａは、第１の支持板１４を一体的に回動させるためのギアＡで、ギアＢ１１ｂを介して駆動装置１１により、回転駆動されるようになっている。

【0046】

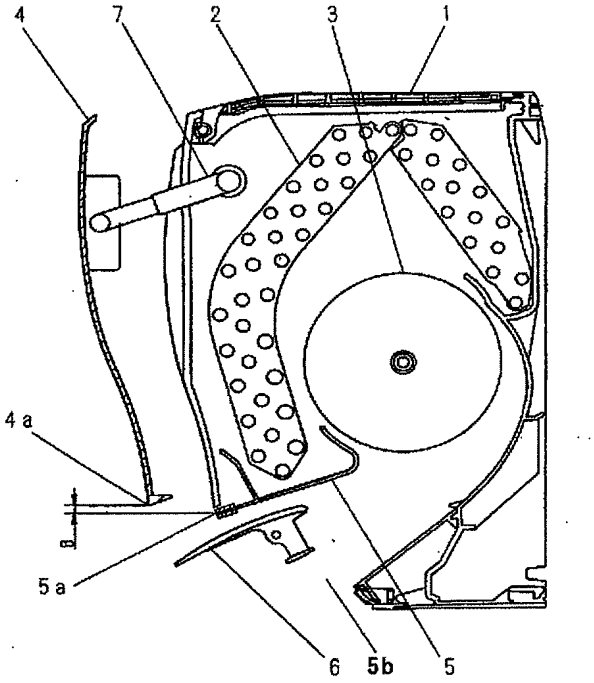
上記構成において、駆動装置１１は、熱交換器のほぼ最高部と最前部より内側に配設され、軸１４ａを駆動装置の略上方に配設されるため、運転時に、ギアＢ１１ｂが回動されると、まず連接するギアＡ１１ａに駆動が伝動され、軸１４aを回動させ、さらに支持板１４を時計方向に回動させて、パネル４を上方に移動できる。このように部品を配置することにより、駆動機構を小型化でき、本体１の薄型化が図れ、すっきりとした美観性の高いデザインにすることができる。

【産業上の利用可能性】
【0047】
以上のように、本発明にかかる空気調和機は、前面パネルを開口部のない美観性の高いデザインにすることができるとともに、桟などの表面の凹凸がないため、汚れにくく、また汚れた場合にも、拭き掃除が容易となり、また、吹出し口より吹出した冷風が前面パネルの下端に当りにくいため、結露も防止が可能となるので、高いインテリア性を求める住宅等の用途にも適用できる。
【図面の簡単な説明】
【0048】
【図1】本発明の実施の形態１における空気調和機の運転停止時の横断面図
【図2】同空気調和機の運転時の横断面図
【図3】本発明の実施の形態２における空気調和機の横断面図
【図4】同空気調和機の運転停止時の正面図
【図5】本発明の実施の形態３における空気調和機の支持具の拡大図
【図6】同空気調和機の運転停止時の横断面図
【図7】従来の空気調和機の正面図
【符号の説明】
【0049】
１　本体
４　前面パネル
４ａ　下端
５　吹出しグリル
５ａ　上端
５ｂ　吹出し口
８　表示部
１１　駆動装置
１２　支持具
１４　第１の支持板
１５　第２の支持板

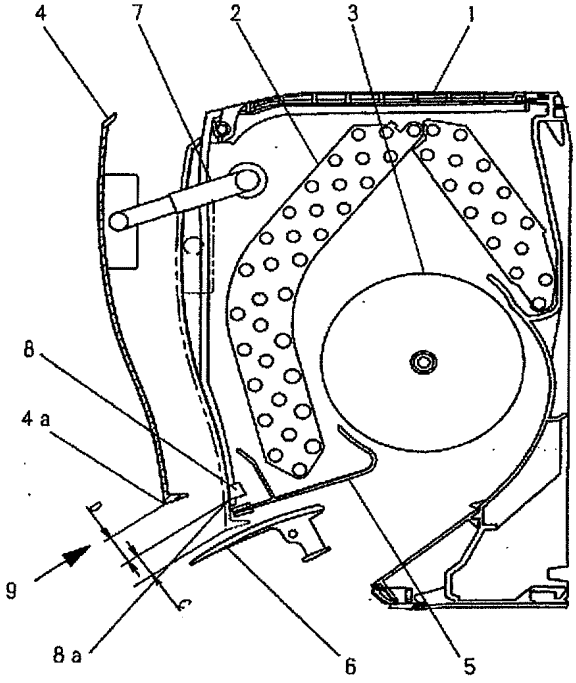
【図1】



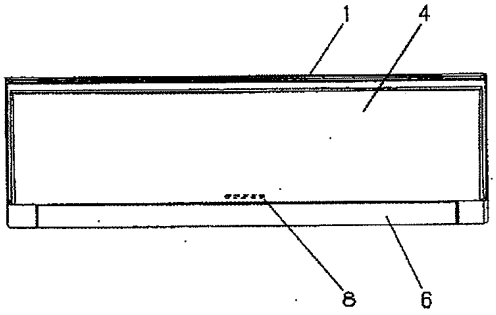
【図2】



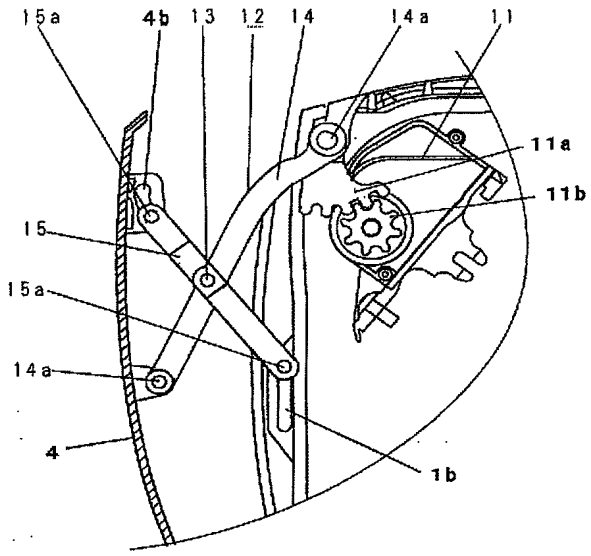
【図3】



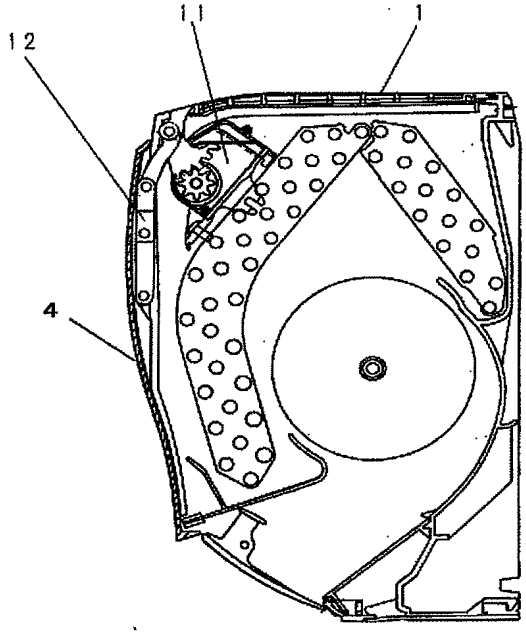
【図4】



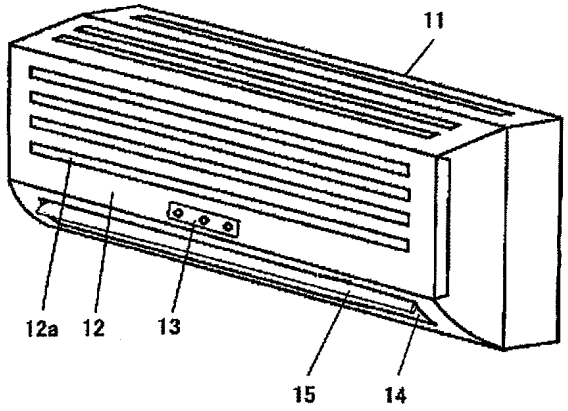
【図5】


15a
4b
13
12
14
14a
11
11a
11b
15
15a
14a
4
1b

【図6】


11
1
12
4

【図7】


11
12a
12
13
15
14

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Ｆターム(参考) 3L051 BG06　BH06